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Fats and Oils

FOR COOKING AND TABLE USE

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American families spend 8 to 18 percent of their food money for fats and oils. Naturally with the market offering so many kinds of cooking and table fats, the consumer asks what is the nutritive value of the different fats and what each contributes to the diet. Also the homemaker wants to know which fats are most desirable for different uses in food preparation. That is, do some kinds of fats have qualities that make them more suitable for one purpose than another? How do different kinds of fats compare in digestibility? Are there Federal grades and standards to aid the consumer in buying fats and oils? These and other questions about the consumer use of fats and oils for table and cooking purposes are answered briefly in this publication.

FOOD VALUE OF VARIOUS FATS

Energy value Fats are high-calorie foods, important in the diet as a source of energy-yielding material. They are also valued for the flavor, richness, and staying quality they give to the day's meals. Many of the edible fats and oils contain fatty acids essential in good nutrition.

In fuel or energy value, fats top the list of foods, yielding as they do more calories per pound than any other kind of food. Many commercial food oils and fats are practically 100-percent fat and furnish energy only, to the extent of about 4,080 calories per pound. Suet, butter, and the oleomargarines contain some water and other substances. Consequently they are only about 80- to 85-percent fat and yield about 3,300 calories per pound. Substances other than water that occur in some fats are vitamins, and characteristic flavoring and coloring materials.

Vitamin values Vitamins A, D, and E are present in some fats. Butter furnishes vitamin A and vitamin D. The vitamin A value of butter depends to a very large extent upon the vitamin A value of the cow's feed. Summer butter is in general higher in vitamin A value than winter butter unless the winter ration has been reinforced with feeds rich in carotene or vitamin A. Butter has been found to range as a source of vitamin A from less than 1,400 to more than 27,000 International Units per pound.

The vitamin D value of butter varies too, as it depends not only on the cow's feed but also on the extent to which the cow is exposed to sunlight. Butter may be increased in vitamin D content by including irradiated feeds as part of the ration, or by exposing the cows to sunshine. The vitamin D content of butter has been found to vary between 40 and 1,800 International Units per pound.

Vegetable fats and oils are likely to contain very little if any vitamin A; neither are they significant sources of vitamin D. Most animal-body fats contain in their natural state at least small amounts of vitamin A. However, very little of the vitamin A content remains in fats and oils after they undergo the rendering or refining processes commonly employed in preparation for the market.

Generally speaking, then, salad oils and cooking fats other than butter and oleomargarine are not considered appreciable sources of vitamins A and D. The value of oleomargarines as sources of vitamins depends upon the vitamin content of their ingredients. Animal-fat oleomargarines that contain a substantial proportion of oleo oil have some vitamin A value. In general, however, oleomargarines are not considered good sources of vitamins A and D unless they are fortified with vitamin concentrates. The manufacturers of some vegetable oleomargarines have fortified their products with vitamin A concentrates. The manufacturers of oleomargarines that contain animal fats inspected under the Federal Meat Inspection Act, are not permitted to add vitamin concentrates.

Vegetable oleomargarine accepted by the council on foods of the American Medical Association as fortified in vitamin A must provide at least 7,500 International Units of this vitamin per pound of the oleomargarine and be so labeled. Such oleomargarine may also be labeled "contains vitamin D," as both vitamins A and D are present in the concentrates added in the manufacturing process. The intention of the manufacturers is to add these vitamins in the proportion in which they occur in so-called "average" butter.

Vitamin E is present in small amounts in nearly all vegetable oils; some of them are rich sources. Oleomargarines, hydrogenated fats, and salad oils provide this vitamin in proportion to the amount of vitamin E-rich oils the manufacturers' formula includes.

Digestibility

The term "digestibility" as generally used may refer to rate or ease of digestion. As used in reporting scientific studies, this term refers either to rate or to completeness of digestion. Fats are more slowly digested than foods with low fat content. For persons in normal health, fat in the diet offers the advantage of slowing down the emptying rate of the stomach, thereby preventing the early return of a feeling of hunger. So far as completeness of digestion is concerned, there are only small differences between various kinds of fats.

GUIDES TO SELECTION OF FATS

The ideal buying guides for the consumer at the food market are informative labels that not only state the weight of the contents of a container but also describe the quality of the contents in terms of grade. In recent years grade labeling, based on standards and grades proposed by the Agricultural Marketing Service, has been developed for some kinds of foods, notably meat, eggs, butter, and some canned products.

The Federal Meat Inspection Act of March 4, 1907, protects the consumer when buying animal fats which enter into interstate commerce by providing for their inspection for health of animals and sanitation of plants, and by prohibiting any false or misleading information on the label.

The Federal Food, Drug, and Cosmetic Act, approved June 25, 1938, and effective essentially 1 year from that date, empowered the United States Department of Agriculture to expand its jurisdiction over the quality and labeling of all packaged foods.[1] Accordingly, labels on edible fats and oils must now give sufficient information to enable the consumer to identify the contents of the container, as "corn oil," "olive and peanut oil."

Butter

At the present time butter is the only fat for which the Government has set up definite standards of quality. The use of this inspection and grading service is optional on the part of the producer or merchandiser. While a great deal of butter is graded annually by the Government, only a relatively small amount reaches the retail market with the Government certificate of quality. Such certificates may be obtained on application of the merchandiser for butter that has been graded U. S. 93 or U. S. 92 by the Agricultural Marketing Service. The certificate gives not only the score but also the date of grading. If properly refrigerated, this butter should be in prime condition, that is of the same score, several weeks after it is graded.

Butter having a score of U. S. 93 or U. S. 92, some of which carries a certificate of quality, makes up about 20 to 25 percent of the butter available on the retail market. The remainder of the butter sold scores between 91 and 89. Butter scoring 93 is described as having "fine" flavor; 92-score butter has "pleasing" flavor. These are further described as having firm body and as light or medium in color and in amount of salt. Butter scoring lower than 92 has a more highly developed flavor, and on this basis is preferred by some consumers. Only when all butter is graded and information is available on the quality of each grade will the consumer have maximum benefit from the grading service.

Butter is made from either ripened or unripened cream and contains in addition to butterfat a small proportion of the natural milk constituents and some water. If sold in interstate commerce, butter must contain not less than 80 percent of milk fat. The addition of coloring and salt is optional. The butter made from unripened cream is called sweet-cream butter and may or may not be salted. Process or renovated butter is usually made from butter of inferior quality treated to remove undesirable odors and flavors and then rechurned in fresh milk and cream. It is produced under license, carries a Federal tax of one-fourth of a cent per pound, and must be plainly labeled either "Process Butter" or "Renovated Butter."

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[1] The enforcement of the Food, Drug, and Cosmetic Act was transferred from the Department of Agriculture to the Federal Security Agency on June 30, 1940, under the President's reorganization order No. 4.

Oleomargarine

Table fats other than butter are designated by the consumer as margarine, "nut" margarine, or oleomargarine. However, it is required by law that this product be labeled oleomargarine whether it is made wholly from oils of plant source (vegetable or nut oils), from oleo or other animal fats, or from a mixture of plant and animal fats. Oleomargarines are made by churning bland fats other than butterfat in ripened milk, generally skim milk, thus producing a product that has many of the characteristics of butter except its flavor.

Oleomargarines are not graded and sold under score, but those made from animal fats and sold in interstate or foreign commerce are manufactured under Government regulations. Animal fats used in oleomargarine are Government-inspected, and the preparation of such oleomargarine is supervised by the Bureau of Animal Industry. A Federal tax of 10 cents a pound is levied on colored oleomargarine and a tax of one-fourth of a cent a pound on all uncolored oleomargarine. In many States there is an additional tax. Uncolored oleomargarine is commonly packed with a small pellet or capsule of coloring for home use. Good oleomargarines are wholesome fats, desirable in flavor.

Lard

Packaged lard and compounds as well as other cooking and shortening fats which have animal fat as an ingredient are labeled "U. S. Inspected and Passed by the U. S. Department of Agriculture." This stamp means that the material from which the product is made has been inspected and passed by the Federal Meat Inspection Service as pure and wholesome. The service also provides that all meat products must be labeled by their true name, for example "pure lard," "refined and hydrogenated lard," "pure lard, beef fat added."

Lard is the fat rendered from the fatty tissues of the hog. Some manufacturers of lard designate their product by such names as "Maple leaf brand lard" or "Hickory leaf brand lard," which appear on the carton. These labels are merely trade names and should not mislead the consumer to believe that the product is made from leaf fat. Pure leaf lard made from the leaf fat and kettle-rendered at low temperature is on the market in very limited amounts.

Other lards marketed in limited amounts are: Neutral, kettle-rendered, dry-rendered, drip-rendered, and hydrogenated lards. These lards are sold under trade names, but in some cases the label contains information concerning the method of manufacture, which helps to identify them.

Most of the lard on the retail market is of the refined steam-rendered type. This lard is made from fat stripped from the internal organs at the time of slaughter and from trimmings from the various market cuts, rendered under steam pressure at a high temperature and then refined.

Hydrogenated fats and compounds

The hydrogenated fats are made from one oil or a mixture of oils treated with hydrogen in the presence of heat and a catalyst to produce a plastic fat. Many hydrogenated fats are made from cottonseed oil, though coconut, peanut, soybean, sesame, and marine oils are also used. Some lard is also hydrogenated.

Compounds are made from a mixture of animal fats, of hydrogenated vegetable oils, or of animal and vegetable oils. They are combined in the proportion that will give a product comparable in consistency to lard or to hydrogenated oils.

Salad oils

The oils are fats which are liquid at ordinary temperatures. The principal oils on the market are those from cottonseed, corn, soybeans, peanuts, and olives. The oil, except some of the olive oil, is refined. All salad and cooking oils must be sold in accurately labeled containers, according to the Federal Food, Drug, and Cosmetic Act. This ruling enables the purchaser to know if the contents consists of a single kind of oil (corn, peanut, olive) or of a mixture of oils.

The highest grade of olive oil is obtained from the first cold pressing of crushed ripe olives. Such oil was originally designated as virgin oil, but the term has been overworked to such an extent that the label "Virgin olive oil" now may have little meaning as to quality. The labels "French olive oil," "Italian olive oil," or "Spanish olive oil" may be misleading to the consumer as they do not necessarily indicate quality characteristics. Much of the foreign oil is refined and blended for American shipment. Refined olive oil, contrary to the impression the label may create, is of lower quality than the unrefined product.

RETAIL MARKET UNITS AND COST

The price of various fats depends in part upon the original cost of the fat and in part upon the cost of the processing involved in the manufacture. Animal fats are usually more expensive to produce than vegetable oils, but the processing of vegetable fats is generally more complicated and therefore more expensive than that of animal fats. Of the vegetable oils, olive oil is the least expensive to produce but demand keeps it higher in price than other vegetable oils. The olive oil produced in California, though limited in amount, is cheaper than imported oils. Accurately labeled mixtures of olive oil with other vegetable oils are available at lower cost than pure olive oil.

The price per unit of any kind, quality, or brand of fat may depend also upon whether it is purchased in bulk or in package and upon the size of the unit purchased. Butter, lard, and compounds can be bought in bulk usually at lower unit cost than in cartons or other containers. In buying packaged fats the amount stated on the label should be used to determine cost in relation to contents. The Federal Food, Drug, and Cosmetic Act requires every package of food sold in interstate commerce to carry a plain and conspicuous statement of the weight or volume of contents.

Fats are usually marketed by weight in cartons, pails, or cans, each containing a certain number of pounds or fractions thereof, from ¼ to 10 pounds. Oils are marketed in bottles and cans. Bottles are used more extensively for olive oil than for other kinds, and they may contain from 2, 3, or 4 ounces up to a pint or a quart. Oils (including olive) are available also in cans of half-pint, pint, and quart capacity and sometimes in half-gallon and gallon size.

The amount of any type of fat to purchase at one time should be determined by the needs of the family, suitable storage space in relation to the keeping qualities of the fat, and possible saving due to quantity purchase. The kind of fat to choose from the variety the market offers depends in large measure upon the use or uses to which it will be put.

USES OF FATS

Major uses of fat are for flavoring, frying, and shortening. Another occasional use of fat is to grease pans. Though some fats serve more than one of these purposes, no single fat is equally suitable for all uses.

Flavor is of first importance in selecting fats for seasoning and for a spread. However, choosing from among the different kinds is largely a matter of personal taste, customary food habits, and cost.

Butter and oleomargarine are the most commonly used spreads, and among the salad oils are olive, with its characteristic flavor, and the bland oils such as cottonseed, corn, peanut, and soybean. Butter, oleomargarine, chicken fat, drippings from bacon or salt pork, and olive oil are frequently selected for seasoning vegetables and other cooked foods. Any of the fats add richness to the foods in which they are used for seasoning.

For frying

Though bland flavor is desirable in a fat used for frying, much more important is the amount of heating the fat can stand before it smokes. Deep-fat frying may require a temperature as high as 400° F., and a fat chosen for this purpose should, therefore, allow for heating above this point without smoking. This is especially important in view of the fact that each time a fat is heated, its smoking temperature is lowered.

When a heated fat smokes, it is breaking down chemically. The fumes it gives off have a sharp odor and are irritating to the mucous lining of the nose and throat. If these fumes are absorbed by the fried food, they give it an unpleasant flavor, and they may be irritating to the digestive tract. Once a fat is heated to the smoking point, its period of usefulness is decreased because it becomes rancid more easily.

For these reasons, only fats that have high smoking temperatures are suitable for deep-fat frying. They include the vegetable oils (except olive), hydrogenated fats, some compounds, and high-quality lards. Olive oil is not desirable for this purpose because of its low smoking point. For frying potato chips and other foods served cold, a fat that is liquid at room temperature (70° F.) gives a luster to the products that is not obtained with a solid fat.

The choice of fats for pan-frying, or sautéing (browning in a small amount of fat) is not limited to those with a high smoking point because the cooking may be done at lower temperature than is possible for deep-fat frying. Fats recommended for pan-frying, therefore, include butter, oleomargarine, olive oil, and drippings, as well as the kinds suitable for deep-fat frying. Fats for pan-frying should not, however, be heated high enough to smoke.

For shortening

The purpose of shortening in pastry, biscuits, muffins, and cakes is to make a tender product. Because these products differ in texture and desired flavor, they require different qualities in a fat. The differences in the shortening value of fats show more plainly in making pastry than in the other products.

Lards, compounds, hydrogenated fats, butter, and oleomargarines all have characteristics desirable for shortening pastry. It is difficult to compare their effect in general because the shortening value of the different types of hydrogenated fats, lards, butters, and oleomargarines varies, apparently, according to the kinds of oils or fats used or to the method of manufacture. It also varies according to the temperature and method used in mixing. Oils also make tender pastry, although the product may have a mealy rather than the flaky texture produced by a solid fat and may feel slightly oily.

For shortening biscuits, muffins, and other quick breads, practically any of the fats or the oils with a good or bland flavor may be used. For cakes, fats that have good creaming property, such as butter, oleomargarine, and many of the hydrogenated fats, are most desirable. Certain mild-flavored lards can be used for cakes. Combinations of butter with other fats for shortening will give some butter flavor to the product and still keep the total cost lower than if butter only is used.

For greasing cake or bread pans, the bland 100-percent fats and oils are best because they form a continuous film. Butter and oleomargarine contain protein, which coagulates and sticks to the pan. However, if butter is desired to give flavor to the surface of cake, there will be less likelihood of its sticking if a thick layer is used.

Substituting one fat for another

If it becomes necessary to substitute one fat for another in a recipe, the first impulse often is to use measure for measure. However, the amount of actual fat in a cupful is not the same for all fats, since some contain water and some contain a harmless inert gas that increases their bulk. Therefore, the following rules should govern changes in the kind of shortening:

When butter or oleomargarine is substituted for lard or a similar fat containing no water, about two extra tablespoons of butter or oleomargarine should be added for each cup of fat in the recipe.

If lard or a similar fat containing no water is substituted for butter or oleomargarine, seven-eighths of a cup (one cup less two tablespoons) should be used to replace a cup of butter or oleomargarine.

Some hydrogenated fats, because their bulk has been increased by the incorporation of gas, may be used measure for measure in place of butter or oleomargarine, which contain water.

When hydrogenated fats are substituted for lard, an additional one and one-half tablespoons for each cup should be used.

CARE OF FATS

On the basis of keeping qualities under household conditions, fats can be divided into three classes: Those that keep for a short time only, such as butter and oleomargarine; those that keep for fairly long periods when handled properly, such as unrefined olive oil, lard, and compounds; and still others that keep even longer, such as the refined oils and the hydrogenated fats.

In general, fats and oils should be stored tightly covered in a dry, cold, dark place. Moisture, air, light, and high temperature help to cause rancidity. However, some of the hydrogenated fats are so stable they may be kept at room temperature. They are also of better consistency for ready use as a shortening if not stored at too low a temperature.

Some of the oils of higher melting points solidify in the refrigerator. This does not injure their quality, but they can be used more conveniently if removed from the refrigerator in time to allow them to liquefy before mixing in a salad dressing, for example. Fats and oils absorb odors and should be kept away from strong-flavored substances.

Every particle of surplus fat, unless too strong in flavor or scorched, may be used for cooking. The thrifty homemaker makes sure that the butcher gives her all the fat trimmings she pays for with her cut of meat. She may also buy suet or salt pork to use in food preparation because they are low-cost fats that contribute special flavors. To prepare suet, salt pork, or chicken fat for shortening or pan-frying, cut the fat into very small pieces and render by heating in a double boiler. Straining rendered fats and drippings to remove food particles and storing in a covered container in a cool place will retard spoilage. Store left-over fats and drippings as carefully as any of the commercial fats.

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